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September 17, 1992

Ex Parte

Ms. Donna R. Searcy
Secretary
Federal communications Commission
Room 222
1919 M Street, N.W.
Washington, D.C. 20554

Re: FCC Docket No. 92-101

Dear Ms. Searcy:

This letter is to inform you that I met with the FCC Tariff Division Staff, Michael Mandigo and Christopher Frentrup. The topic of discussion was CC Docket No. 92-101, Treatment of Local Exchange Carrier Tariffs Implementing Statement of Financial Accounting Standards, Employers' Accounting for Postretirement Benefits Other Than Pensions (OPEBs).

Specifically, the discussion focused on MCI's positions stated in its Opposition to Direct Cases filed in the docket on July 1, 1992. Additionally, MCI provided to the Commission staff the attached research paper that was referred to in MCI's aforementioned pleading.

Respectfully yours,

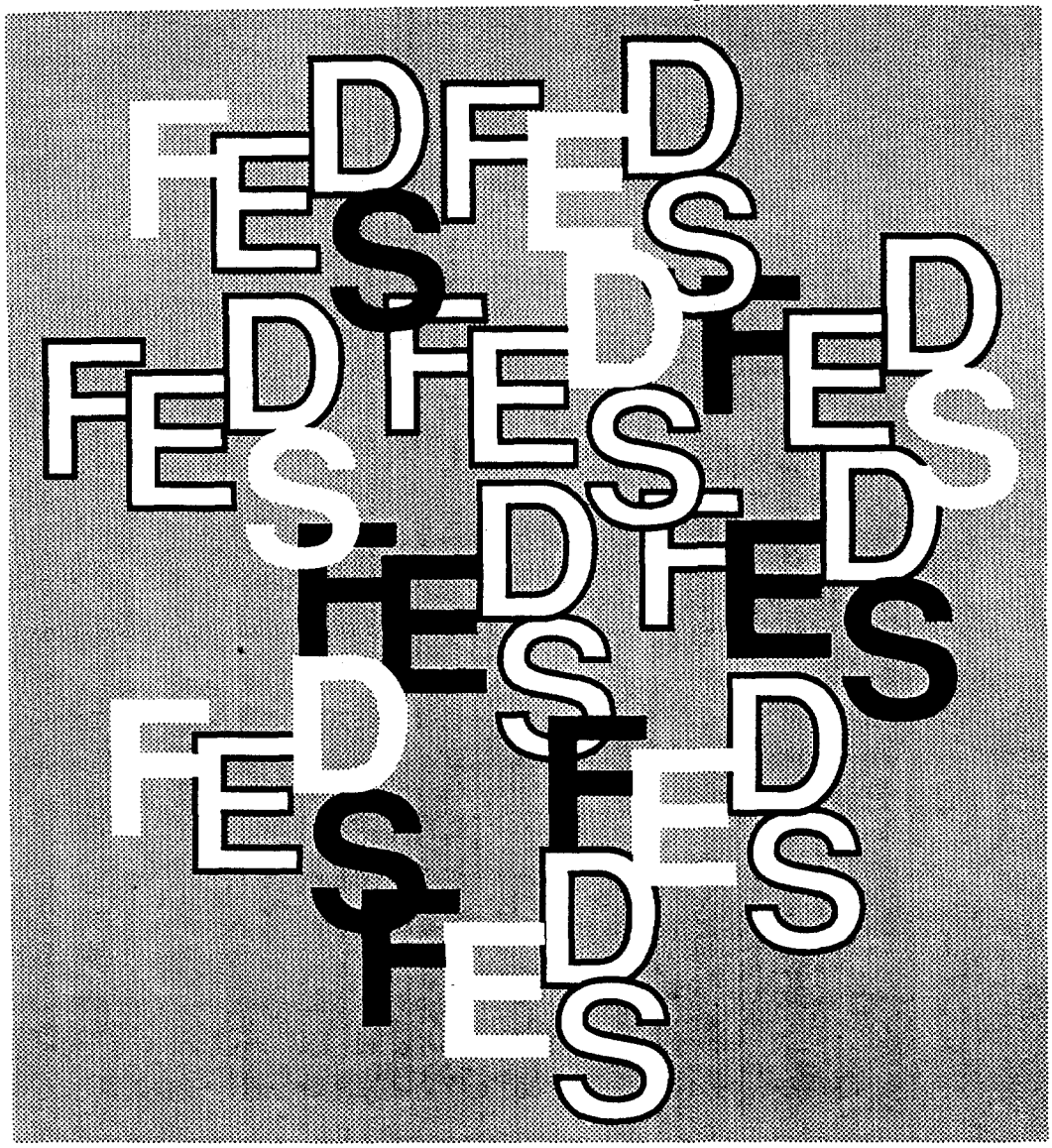
Michael Hydock

Michael Hydock

cc: Michael Mandigo
Christopher Frentrup

Attachment

Finance and Economics Discussion Series
Division of Research and Statistics
Division of Monetary Affairs
Federal Reserve Board, Washington, D.C.



156

THE IMPACT OF LIABILITIES FOR RETIREE HEALTH BENEFITS ON SHARE PRICES

H. Fred Mittelstaedt and Mark Warshawsky

April 1991

The Impact of Liabilities for Retiree Health Benefits on Share Prices

by H. Fred Mittelstaedt and Mark Warshawsky*

April 1991

* Arizona State University and Board of Governors of the Federal Reserve System, respectively. The views expressed in this paper do not necessarily reflect the views of the Board of Governors or its official staff. We gratefully acknowledge the research assistance of Carrie Cristea.

The Impact of Liabilities for Retiree Health Benefits on Share Prices

Abstract

This study examines the association between liabilities for retiree health benefits and share prices. Results suggest that market estimates of the liabilities are imprecise. To the extent that the imprecision is due to insufficient accounting disclosures, significant price adjustments, upward and downward, may occur when information required by a new accounting standard is disclosed. Additionally, there is some evidence indicating that the market does not expect the health benefit obligation to be paid in full. This result is consistent with market expectations that the firms or the federal government will take actions to reduce future health benefit payouts.

(98 words)

The Impact of Liabilities for Retiree Health Benefits on Share Prices

This study examines the association between liabilities for retiree health benefits and share prices. Because of the very significant size of these liabilities for many companies and the attention drawn to them by the deliberations of the Financial Accounting Standards Board (FASB) on the appropriate method of accounting for retiree health benefits, one might expect that estimates for these liabilities should be fully reflected in share prices. However, the market may value these liabilities at amounts that are different from amounts suggested by the terms of existing contracts for four reasons. First, firm-specific information on the benefits under current accounting conventions has been limited to annual cash outflows associated with retirees. Expenses and liabilities associated with *future* commitments are not disclosed. Second, there is disagreement regarding the ability of firms to unilaterally amend or cancel benefits and the effect of such actions on labor relations. Third, it is unknown whether corporations can take actions, such as the reduction of wages of current workers or, in the case of regulated or monopolistic employers, increases in prices, to offset the liability for retiree health benefits. Finally, there is considerable uncertainty with respect to future government action related to Medicare, national health insurance, permanence of retiree health benefit contracts, and tax deductibility of contributions to trusts for retiree health benefits. The scope of the current market recognition of retiree health benefits is important in that it provides us with better insights regarding the impact on share prices of a new accounting pronouncement and the intensity of pressure on firms and the government to reduce the cost of health care.

The results show that the market is aware of corporate liabilities for retiree health benefits. There is, however, a high degree of imprecision surrounding estimates of the liabilities. To the extent that the imprecision is due to lack of disclosure, the results are consistent with observing significant price adjustments, upward and downward, upon the release of information under the new accounting standard. An alternative explanation is that the imprecision is due to a large degree of uncertainty regarding future corporate or government actions. If this is the case, then share prices may move very little upon the release of information under the new accounting standard.

Additionally, there is some evidence indicating that the market may be underestimating the extent of

corporate obligations for retiree health benefits, at least compared with estimates calculated using the framework of the new accounting standard to be employed by corporations beginning in 1993. This result is consistent with the view that the market expects someone, corporations or the federal government, to do something that would effectively reduce the future burden of corporations for retiree health benefits. Such actions could range from allowing corporations to cancel or significantly reduce the level of benefits in retiree plans, thereby placing more of the burden for health care on retired individuals, to further socialization of health care in the form of expanded Medicare coverage or national health insurance. A center-of-the-road action would be to allow companies some relief in the form of the tax deductibility of contributions to trusts devoted to funding retiree health benefits.

The rest of this paper is organized as follows. Because of many numerous institutional features of retiree health benefit contracts, Section I provides a thorough discussion of typical plan provisions, accounting practices, and alternative assessments by the market. Section II describes a method for estimating the retiree health benefit obligation from existing accounting disclosures. This method is used to compute the retiree health benefit obligation variable employed in subsequent empirical tests. Section III gives the specific theoretical model and variables used to assess the impact of retiree health benefits on prices of corporate equity shares. Section IV briefly outlines the criterion used in selecting the sample of companies utilized in the analysis, while Section V describes in some detail the empirical results. Section VI contains the paper's conclusions.

I. Background

Description of Retiree Health Benefit Contracts

The Bureau of Labor Statistics (1989) in the 1988 survey of employee benefits offered by medium- and large-size companies reports that approximately 45 percent of health plan participants would be provided with free or highly subsidized health insurance benefits upon retirement. For retirees below age 65, these benefits are often identical to, and provided at the same terms as, health insurance benefits given to active workers. For retirees above age 65, employer-provided retiree health plans supplement the benefits of the

Medicare program, particularly by covering outpatient prescription drugs. Employer plans for retiree health benefits have existed since the 1950s and the costs for such plans were for many years relatively small. More recently, however, skyrocketing health care costs, early retirement programs, and increased longevity have combined to cause the dramatic escalation of employer costs for retiree health plans. As evidenced by attempts by some employers to reduce or cancel benefit plans and by the resulting strikes and litigation pursued by unions and retiree groups, retiree health benefits are becoming an increasingly prominent and contentious issue.

Although some employers may view retiree health benefits as a mere gratuity, subject to their unilateral decision to amend or cancel the plan benefits, legal and practical considerations may make the benefits a fairly fixed obligation. As a legal matter, the ability of employers to cancel or amend benefits is highly uncertain, owing to different precedents established in various circuits of the federal courts in interpreting the language of contracts and the intentions of relevant parties.[1] More importantly, as a practical matter, concerns about ethics, labor relations (particularly in a unionized environment), and public relations impose constraints on the ability of employers to act unilaterally on this issue. Many in the consulting, investment and business communities also agree that a liability exists. According to Martens and Stevens (1990), of the 467 comment letters responding to the accounting standard for retiree health benefits proposed in 1989 by the FASB requiring the calculation of a liability, 69 percent agreed that a retiree health benefit liability exists, 14 percent stated that a liability does not exist, and 17 percent did not state an opinion on the issue.

Accounting for Retiree Health Benefits

Although it is fairly clear that liabilities for retiree health benefits exist, only limited firm-specific information about these benefits has been available to the investment community. Along with changes in accounting standards for pensions, the FASB has considered since the late 1970s the issue of the appropriate accounting guidelines for retiree health benefits. In 1984, as a temporary measure pending the promulgation of final guidelines, the FASB required employers to disclose the annual cash outlays (pay-as-you-go costs) for retiree health benefits in their annual statements, if such costs were deemed to be material. In addition, the

interim standard, *Statement of Financial Accounting Standards No. 81 - Disclosure of Postretirement Health Care and Life Insurance Benefits* (Statement No. 81), required a brief description of the benefits provided, the employee groups covered, and the accounting and funding policies followed for these benefits.[2]

In December 1990, the FASB issued the final version of an accounting standard first proposed in February 1989. *Statement of Financial Accounting Standards No. 106 - Employers' Accounting for Postretirement Benefits Other Than Pensions* (Statement No. 106) applies to financial statements with fiscal years beginning after December 15, 1992. With promulgation of this new accounting standard, the FASB expressed definitively that it viewed retiree health benefits as a form of deferred compensation and not as a gratuity. As such, the FASB imposed the requirement that the methodology of accrual accounting be utilized for these benefits. In particular, the *accrued* expense replaces the pay-as-you-go cost on the income statement and an estimate of the accrued liability is disclosed in financial statement footnotes. Furthermore, very explicit guidelines are given in the accounting standard about the assumptions and attribution methodologies to be used in valuing retiree health benefits.

For the most part, the method of accounting for retiree health benefits promulgated in the new standard parallels the current method of accounting for pensions.[3] In particular, both methods produce an accrued liability which is the actuarial present value of benefits attributed to employee service rendered up to a specified date. The expense recognition method for both pronouncements uses a benefits/years-of-service approach that attributes the employer's expected benefit obligation to each year of service in the attribution period. Because the expense measure is not the primary focus of the paper, further discussions will concentrate on the liability measure.

The liability for retiree health benefits is measured using actuarial assumptions which include the discount rate and the amount and timing of future benefit payments, which in turn depend on assumptions about per capita claims cost by age, health care cost trend rates, and the Medicare reimbursement rate. The discount rate must reflect rates of return available on high-quality fixed-income investments. The trend rate of health care cost should reflect factors other than changes in the demographics of plan participants. These factors include health care inflation, changes in health care utilization, and technological advances. The

assumed rate of Medicare reimbursement should be consistent with current law; future changes in the program may not be anticipated unless such changes are already enacted into law. An employer is, however, allowed to anticipate his own intended changes in a plan's cost-sharing provisions, if such changes owe to the employer's policy of cost-sharing, as evidenced by past practice or communications with workers. In addition to assumptions specific to retiree health plans, actuarial assumptions must be made about variables also used in pension accounting. These include employee turnover, retirement age, mortality, and the number of covered dependents. The retiree health obligation is to be disclosed in the footnotes to financial statements. A requirement that a liability be placed on the balance sheet was dropped from the final accounting pronouncement. Assets held in trust for the plan obligations are also to be disclosed. However, unlike pension plans, very few retiree health plans are currently prefunded.

The shift to the new accounting standard is expected to significantly decrease net income and result in the disclosure of a large previously undisclosed liability. Warshawsky (1991) estimates that the new expense measure will be approximately five times the pay-as-you-go cost and the accumulated postretirement benefit obligation will be approximately 30 times the pay-as-you-go cost. Coopers & Lybrand (1989, p. 100) estimate the ratio of new expense to pay-as-you-go cost to be 2.6 for a mature plan and 6.3 for an immature plan and estimates the ratio of accumulated postretirement benefit obligation to pay-as-you-go cost to be 15.7 for a mature plan and 33.3 for an immature plan. Warshawsky (1991) estimates the total accrued liability that would have been reported by all corporations in 1988 if they had followed Statement No. 106 to be $332 billion. The U.S. General Accounting Office (1988) and the Employee Benefit Research Institute (1988), using a looser accounting framework and lower cost assumptions, estimate the accrued liability to be $221 billion and $247 billion, respectively.

Market Assessment of Retiree Health Benefit Liabilities

The current assessment by the market of retiree health benefit liabilities and the impact of future accounting rules on that assessment is an open question. Given the current level of disclosure, investors may not have enough information to obtain reasonable estimates of the health benefit liability. If too little information regarding health plans is disclosed currently, as suggested by the FASB in Statement No. 106

(1990, par. 124-125), then there may be a very low association between retiree health liabilities and stock values.

In contrast, Standard & Poor's Corporation (1989) and some stock analysts (see, for example, discussions in Freudenheim, 1989 and Henriques, 1989) state that bond ratings and stock prices already reflect rough estimates of retiree health liabilities. Use of the currently disclosed pay-as-you-go cost combined with information about a firm's industry and employee composition may allow investors to make reasonable estimates of the underlying health liabilities when pricing securities. In addition, there are at least two reasons to suspect that the Statement No. 106 measure could be an over-estimate of the market's view of the retiree health obligation. First, if there is a significant probability that benefits will be canceled or cut substantially, without an adverse reaction from the union or other employee groups, less than full recognition by the market is warranted. In the second instance, the market may anticipate some action by the federal government effectively reducing corporate obligations for retiree health. For example, the Medicare Catastrophic Care Act of 1988, if it had been retained, would have reduced significantly employer liabilities for health benefits provided to retirees above age 65.

The scope of the current market recognition, particularly if it is less than complete, is potentially important in two ways. First, rather obviously, if the market is not fully informed of the extent of corporate liabilities for retiree health benefits, the release of relevant information for 1993 upon application of the new accounting standard will lead to changes in the prices of corporate securities with implications for the cost of capital of the affected corporations. Second, if the market is fully informed and also is anticipating deep cuts by employers in retiree health plans, there is at least the possibility that the affected retired and active workers could turn to the political process to obtain stronger guarantees concerning the security of retiree health benefit plans, such as mandatory prefunding and vesting standards. Either type of reaction also will have important implications for the development of corporate and public policies towards the provision of health care benefits, more generally.

Therefore, the purpose of this study is to examine the extent to which the Statement No. 106 health liability is currently reflected in stock prices. Because Statement No. 106 amounts are not required disclosures

until 1993, a method for converting pay-as-you-go costs to Statement No. 106 liabilities must be developed. This method is described in the next section.

II. Estimation of Accrued Liability

The basic structure of the model entails the calculation of the expected present value of future health benefits to be received during the period of retirement for three sets of plan participants: retirees, active workers eligible for early retirement and hence generally eligible for retiree health benefits, and (younger) active workers potentially eligible for benefits. General assumptions are made about per capita health care costs, adjusted for age, the portion of the health cost paid by Medicare and employer-provided health insurance, discount rate, and medical inflation rate. All assumptions are based on recent medical cost and actuarial data, and represent best estimates. The model then gets a demographic overlay, which includes assumptions about age distributions and turnover rates of employees and can be varied to reflect the experience of individual firms. See Warshawsky (1991) for further details.

In the absence of information about the specific characteristics of individual companies, data for five demographic groups developed from actual plan data by the American Academy of Actuaries Committee on Pension Actuarial Principles and Practices (hereafter, AAAC) are used. Pay-as-you-go cost, retiree health benefit liability, and a retiree health benefit liability to pay-as-you-go cost index (hereafter, the liability-to-cost ratio) is calculated for each group. AAAC (1985, 3) describes the groups as follows:

1. Normal Group - This represents a reasonably mature and stable group which is projected to continue to grow. It is typical of many large companies.

2. Older Group With Long Service - This represents a currently stable company having rapid growth 10 to 20 years ago which has since tapered off. The number of employees has been level for several years and is projected to remain so. Turnover is relatively low.

3. Stable Mature Group - This group is a mature company with a relatively high age, long service and a large number of retirees. The number of employees has been the same for many years. It is projected to continue level. Turnover is relatively low in early years of employment and very low for longer service employees.

4. Cyclical Bimodal - This is an old hourly group with a substantial number of retirees and large retiree liabilities. The age distribution is bimodal. Approximately, 20% of the employees are over age 55 and 25% are under age 30. Employment is cyclical, but declining overall.

5. Old Long Service Group - This is an hourly plan with high average age and years of service. Almost 50% of the employees are over age 50. Even though this group is declining, replacement of retiring employees will cause the average age and service to decline.

The data provided for each group is normalized to 10,000 active participants with the participants categorized into age-tenure profiles. For example, in Plan 1, 1,224 active participants are between the ages of 25 and 30 and have 2 to 4 years of credited service. Information regarding probability of leaving the firm before full eligibility (assumed to be 10 years of service and attainment of age 55), probability of retiring at a given age (assumed to be between ages 55 and 66), and extent of dependent coverage is also provided by the AAAC. The number of total retired participants varies by group, and the age distribution of retirees (beginning at age 55) is based on data reported in Doran, MacBain, and Reimert (1987).

Table I provides a summary of the equations used to estimate the pay-as-you-go cost, the retiree health benefit liability, and the resulting liability-to-cost ratio for each demographic group. The retiree health liability is the sum of the present value of benefits owed to three sets of participants: retirees, fully eligible employees, and potentially eligible employees. The calculations for each set of participants are discussed below.

Insert Table I Approximately Here

The pay-as-you-go cost (calculation 1) for each demographic group is obtained by summing the expected health costs in a given year for that group's retirees. The 1988 per capita covered cost of health care for a retiree age 55 is assumed to be $1,500, an average for the relevant population. This amount is derived by adjusting for medical inflation the 1986 per capita cost reported in Coopers and Lybrand (1989). The amount is also consistent with data reported in Waldo *et al.* (1989) and Garfinkel, Riley, and Iannacchione (1988). Claim costs are assumed to increase in real terms approximately five percent per age over the ages 55 through 70, but the rate gradually slows until costs remain essentially flat at age 95 (see Hutchings and Ullman, 1983). For retirees above age 65, it is assumed that the employer is responsible for only 30 percent of the cost because of Medicare. Costs are also multiplied by one plus the proportion (S) of retirees expected to have spouses covered by the retiree health benefit plan. Spouses are assumed to be three years younger

than the plan participant. The number of retirees, R_r, and S vary across demographic groups.

The present value of health benefits owed to current retirees (calculation 2) is obtained by assuming, for example in 1988, a discount rate, i, of nine percent and a medical inflation rate, m, of eight percent and then discounting the stream of expected future health care costs for current retirees and their spouses.[4] Expected costs at each future age are adjusted for $ps_{a|x}$, the probability of retirees at age x surviving to age a where a varies between age 55 and 105. Survival probabilities are based on the 1983 Group Annuity Mortality Table.

Employees are assumed to be fully eligible for benefits if they have reached age 55 and have been employed by the firm for at least 10 years. The calculation of present value of health benefits owed to fully eligible active employees (calculation 3) is similar to calculation 2 except that terms are added to allow for varying retirement dates. The present value of retiree health benefits *at the age of retirement* is discounted to the fully eligible participant's age through the term $(1+m)^{y-x}/(1+i)^{y-x}$, where y is the expected retirement age and x is the current age of the participant. The term, $pr_{y|x}$, adjusts this present value for the probability of retiring at any age between age 55 and 65, inclusive and sum to one for a given x. Each summation over y is multiplied by the number of fully eligible employees age x (FE_x); the resulting products are then summed over the age groups, 55 through 65. FE_x and $pr_{y|x}$ vary for each of the five demographic groups.

Calculation 4 for the present value of benefits owed to potentially eligible active employees expands calculation 3 by allowing for termination of employment prior to becoming fully eligible for retiree health benefits. The portion of calculation 4 beginning with the second summation sign represents the present value of retiree health benefits *at the age of full eligibility*. This value is then discounted to the average age, x_n, of potentially eligible employees in age-tenure group n using the term $(1+m)^{z_n-x_n}/(1+i)^{z_n-x_n}$, where z_n is the expected retirement age. In most cases, z_n is 55, but for some groups where employees are near 55 but have tenure less than 10 years, z_n exceeds 55. The term, pe_n, adjusts this present value for the probability of leaving the firm prior to obtaining full eligibility. This amount is multiplied by E_n to reflect the portion of the retiree benefits earned to date. Consistent with Statement No. 106, E_n is the ratio of years of credited service to total

years of service required to reach full eligibility for age-tenure group n. For example, assume that an age-tenure group is age 50 with 20 years of service; given that employees must be 55 to be fully eligible, E_n is .8 (calculated as 20/25). The adjusted present value for each age-tenure group is multiplied by the number of employees in each group, ATG_n, and summed across 81 age-tenure categories. ATG_n, E_n, and pe_n vary across the five demographic groups.

The retiree health liability (calculation 5) is the sum of the present values of benefits owed to retirees (calculation 2), fully eligible active employees (calculation 3), and potentially eligible employees (calculation 4). The liability-to-cost ratio (calculation 6) is computed by dividing calculation 5 by calculation 1.

Table II gives the percent of retired participants, average age of active participants, probability of remaining to retirement, expected retirement age, and cost-to-liability ratio for each of the five demographic groups. The liability-to-cost ratios range from 19.9 to 52.8. In general, plans with a larger proportion of retirees have lower liability-to-cost ratios. However, the liabilities are also influenced by quit rates and age distribution for the active workers. The Older Group with Long Service has the highest ratio because it has relatively few retirees but a relatively large number of active participants nearing full eligibility. The estimates are consistent with, although slightly higher than, Coopers and Lybrand (1989, p. 90) estimates based on data obtained from 26 firms participating in a field study.

Insert Table II Approximately Here

As stated previously, the ratios are calculated using best estimates for economic and actuarial assumptions. However, it should be noted that the relation between the discount rate and the medical inflation rate greatly influences the magnitude of the liability-cost ratio. We assume a discount rate of nine percent and a medical inflation rate of eight percent for 1988 valuations. If both rates are set at eight percent for the Normal Group, the ratio increases by 19 percent; if the discount rate is decreased to seven percent, while again leaving the medical inflation rate at eight percent, the ratio increases by 43 percent.

Firms are assigned a liability-to-cost ratio on the basis of the change in the number of employees over the period 1986 to 1989, as reported by Compustat. The ranges of changes and corresponding group

assignment appear in the last column of Table II. Although this classification method is rather simplistic, it is thought that the rate of growth of the number of employees is negatively correlated with the relative proportion of older long-service active workers and retirees among plan participants, and is also negatively correlated, although weakly, with the probabilities of active workers remaining with the company until eligible for retiree health benefits.[5] For the sample used in this study (see Section IV) 64 firms are assigned to Group 1, 30 firms are assigned to Group 2, 12 firms are assigned to Group 3, 42 firms are assigned to Group 4, and 62 firms are assigned to Group 5. The retiree health benefit liability is then estimated as the cost reported by companies under Statement No. 81 multiplied by the assigned liability-to-cost ratio.

III. Model and Measurement of Variables

The model used in this study for the valuation of a firm's equity is based on the work of Feldstein and Seligman (1981) (FS), Feldstein and Morck (1983) (FM), Hirschey and Weygandt (1985) (HW), and Grant (1990), all based, in turn, on Tobin and Brainard (1977). The valuation of equity shares was examined by FS and FM with special consideration for the informativeness of early standards for pension accounting, and the use of various discount rate assumptions in pension liability evaluations, respectively. The valuations of shares was examined by HW with an eye to ascertaining the impact of different amortization policies for advertising and research and development. As in our study, Grant (1990) examines the impact of retiree health benefits on share prices. Our results are compared to Grant's results in Section V.

If the market value of the firm's total assets is represented by MVA and the replacement cost of the physical (tangible) assets is MVT, then

$$MVA = q(MVT). \tag{1}$$

In general, it is thought that for most firms, q will exceed one because of the existence of some intangible assets, such as market power, unique factors of production, research and development, advertising, and so on.

The market value of the firm's equity, represented by MVE, equals MVA less its liabilities, including pension and retiree health liabilities, denoted MVL. Hence,

$$MVE = q(MVT) - MVL. \tag{2}$$

Following FS, HW, and Grant, q is considered a linear function of research and development (R&D), advertising (ADV), growth (GROW), and risk (RISK). Thus, the equation 2 can be expressed as

$$MVE = (\gamma_1 R\&D + \gamma_2 ADV + \gamma_3 GROW + \gamma_4 RISK)\ MVT - MVL. \quad (3)$$

Dividing equation 3 by MVT yields

$$MVE/MVT = \gamma_1 R\&D + \gamma_2 ADV + \gamma_3 GROW + \gamma_4 RISK - MVL/MVT. \quad (4)$$

The variable, MVE/MVT, may be interpreted as an equity q (Grant 1990). After decomposing MVL into three components - balance sheet liabilities, off-balance sheet pension liabilities, and off-balance sheet retiree health benefit liabilities - the multiple regression analogue of equation 4 can be written as

$$MVE_i/MVT_i = \gamma_0 + \gamma_1 R\&D_i + \gamma_2 ADV_i + \gamma_3 GROW_i + \gamma_4 RISK_i + \gamma_5 MVBL_i/MVT_i + \gamma_6 NPA_i/MVT_i + \gamma_7 RHL_i/MVT_i + \epsilon_i, \text{ where} \quad (5)$$

γ_0 is an intercept, ϵ_i is a disturbance related term, $MVBL_i$ is the market value of balance sheet liabilities, NPA_i is the market value of net pension assets, and RHL_i is the market value of retiree health liabilities. A description of the procedures used to operationalize equation 5 is given in the following paragraphs.

The market value of shareholders' equity (MVE) is defined as price times number of shares outstanding, measured at three and one-half months after the fiscal year end. The delay after the fiscal year end ensures that the 10Ks/annual reports containing retirement plan information had been disseminated prior to the price observations (see Harris and Ohlson, 1987). The price and share data are obtained from Center for Research in Security Prices (CRSP) tapes.

MVT and MVBL are not disclosed in financial statements.[6] Because of the lack of disclosure, it is common to use the book value of balance sheet tangible assets (BVT) and book value of balance sheet liabilities (BVBL) as surrogates for MVT and MVBL (see, for example, Beaver *et al.* 1989). In addition, Landsman (1986) does not reject the null hypothesis that regression coefficients for book assets and book liabilities are different from their theoretical coefficients derived using market values. Therefore, we also substitute book values, obtained from Compustat, for market values.

The q variables, R&D, ADV, GROW, and RISK, are defined in a manner similar to prior studies using the Tobin's q methodology. Research and development, R&D, is defined as the 5-year sum of research

and development expense divided by the 5-year sum of sales. Advertising, ADV, is measured as the 5-year sum of advertising expense divided by the 5-year sum of sales. Growth, GROW, is defined as the fifth root of the ratio of current year's sales to sales 5 years prior to the current year, less 1. In many articles appearing in the literature, RISK is proxied using equity beta. However, because beta has been insignificant in many of these studies, here RISK is measured as the inverse of the coefficient of variation of the change in earnings per share. Specifically, RISK is the 5-year standard deviation of the change in annual earnings per share divided by the 5-year mean of the change in annual earnings per share. The inverse of the coefficient of variation is used to avoid large values caused by mean changes in earnings per share close to zero. All the q variables are obtained from Compustat.

Most pension plans of publicly traded firms have assets in excess of benefit obligations (see Warshawsky 1989). Thus, instead of defining the pension variable as a net liability, it is defined as a net asset. Net pension assets (NPA) is defined as pension assets less the accumulated benefit obligation less (plus) prepaid (accrued) pension cost on the balance sheet.[7,8] This information is disclosed in financial statement footnotes under *Statement of Financial Accounting Standards No. 36 - Disclosure of Pension Information* (Statement No. 36) and *Statement of Financial Accounting Standards No. 87 - Employers' Accounting for Pensions* (Statement No. 87) and is obtained from Compustat.

The market value of retiree health liabilities (RHL) is measured in two ways. The first measure, identical to Grant's, is the reported pay-as-you-go cost. The coefficient on this measure represents the market's perception of the ratio of retiree health liability to pay-as-you go cost. Recall from earlier discussions of the Coopers and Lybrand (1989) study and the Warshawsky (1991) simulation model used in this study that this ratio is expected to be approximately 30. Reported retiree health cost is hand-gathered using Corporate Text.[9]

The second measure is an estimate of the Statement No. 106 liability defined as the product of the pay-as-you-go cost and the model-derived ratio explained earlier. This measure has two main advantages over the reported cost. First, the reported cost does not take into account the demographics of the participants covered by the plan. For example, two firms that report the same pay-as-you-go cost have very different

liabilities if one firm has a low proportion of retirees and the other has a high proportion of retirees. Second, defining RHL as a liability instead of an expense is consistent with the valuation model, thereby making interpretation of the coefficient more straight-forward.

Given the above variable definitions, the coefficients γ_1, γ_2, γ_3, γ_4, and γ_6 are expected to be positive, while γ_5 and γ_7 are expected to be negative. In addition, the Miller (1977) model of market equilibrium predicts that $\gamma_5 = \gamma_7 = -1$, if the second measure of RHL is used. If the first measure of RHL is used, then γ_7 should be around -30. Tests of these predictions are reported in Section V.

IV. Sample Selection

The sample is comprised of both firms that sponsor health plans and firms that do not sponsor health plans. Firms are identified as sponsoring or not sponsoring plans on the basis of word searches in the May, 1990 edition of Corporate Text. Careful examinations of retiree benefit footnotes to annual financial statements identify 676 firms that sponsor retiree health plans and 1540 firms that do not sponsor retiree health plans over the period 1986 to 1988.[10]

Prior studies examining the relation between stock prices and pension liabilities have used only firms that sponsor defined benefit pension plans. Following this tradition, we present separate results for the sample of firms that sponsor retiree health plans. However, we believe that excluding firms that do not sponsor such plans may discard data unnecessarily. If a firm does not sponsor a retiree health plan, then the retiree health liability is zero and should be valued as such by the market. Therefore, results also are presented for the combined sample consisting of both firms that do and firms that do not sponsor retiree health plans.

Because Compustat does not report pension information for the utility and banking industries and research and development is associated primarily with manufacturing firms, the sample for this study is restricted to firms with Standard Industrial Classification (SIC) codes less than or equal to 3999. In addition, to control for cross-temporal differences in security market and industrial factors, the sample for this study is limited to firms with fiscal years ending December 31. Finally some firms are lost due to missing data. For firms sponsoring (not sponsoring) retiree health plans, approximately 45% (53%) are eliminated because of

industry, 14% (20%) are eliminated because of fiscal year, 1% (0%) are missing because the firm already accrues a portion of the retiree health liability attributable to active workers and 9% (10%) are eliminated because of missing data.[11] The final sample of firms sponsoring retiree health plans includes 203 firms, 207 firms, and 210 firms for 1986, 1987, and 1988, respectively. The final combined sample of firms that sponsor and firms that do not sponsor retiree health plans includes 440 firms, 461 firms, and 484 firms for 1986, 1987, and 1988, respectively.

An analysis of the sample by year and industry appears in Table III. The industry assignments follow that of Biddle and Seow (1991). These assignments are also used to estimate standard errors using the Froot (1989) method and to conduct covariance analyses (see below). Note that there are distinct cross-industry differences in the likelihood of sponsoring retiree health plans. For instance, over 80% of the firms in the Chemicals, Petroleum Refining, Glass, Cement, & Ceramics, and Steel industries have retiree health plans, while less than 20% of the firms in the Oil & Gas exploration, Construction, Textiles & Apparel, Rubber, Plastic, & Leather, and Telecommunication Equipment industries sponsor such plans.

Insert Table III Approximately Here

V. Empirical Results

Descriptive statistics

Descriptive statistics for firms sponsoring health plans and the combined sample of firms that sponsor and firms that do not sponsor retiree health plans are reported in Table IV.[12] The first three rows contain three measures of firm size: market value of equity, book value of total assets, and number of employees. All three measures indicate that firms with retiree health plans are larger than firms that do not sponsor retiree health plans. In 1988, for the average retiree health plan sample firm, the market value of equity is $4.02 billion, the book value of total assets is $6.82 billion, and the number of employees is 32,700. The values for the combined sample are approximately one-half of these amounts. This result may be explained because most retiree health plans are not prefunded, and hence only larger, more stable and publicly prominent companies have been trusted by employees to make good on retiree health promises.

Insert Table IV Approximately Here

The next two rows contain the unscaled pay-as-you-go retiree health cost and the unscaled estimated retiree health liability. For the health plan sample, the average pay-as-you-go cost increases from $13.2 million in 1986 to $22.2 million in 1988, and the average retiree health liability increases from $376 million in 1986 to $586 million in 1988. The aggregate off-balance sheet retiree health liability for the 1988 sample is estimated to be $123 billion. The weighted average liability-to-cost ratio for 1988 is 26.4.

The final nine rows present means and standard deviations of the variables used in the regression models. Most of the variables for the two samples are similar. However, the combined sample appears to show higher growth, lower net pension assets, and, of course, lower measures of retiree health liabilities. The lower net pension assets arises from two factors. First, of the 274 firms not sponsoring retiree health plans in 1988, 108 (39%) also do not sponsor defined benefit pension plans, and as a result, the net pension asset variable is set to zero for these firms. All the firms sponsoring retiree health plans also sponsor defined benefit plans. Second, for the 166 firms sponsoring defined benefit pension plans but not sponsoring retiree health plans, the mean net pension asset is .034, compared with .052 for the firms sponsoring health plans.

Econometric Issues

Bernard (1987), Christie (1987), and Froot (1989) suggest that while ordinary least squares (OLS) parameter estimates are consistent, OLS standard errors in studies using annual stock returns or stock price levels, as in this study, are biased because of heteroscedasticity and cross-sectional dependence (contemporaneous correlation). To control for these problems, the method-of-moments estimation procedure introduced in Froot (1989) is used in this study. A brief explanation of the approach is discussed in the following paragraph. Details of the procedures can be found in Froot (1989).

The Froot (1989) method is a generalization of the White (1980) approach developed to account for heteroscedasticity and relies on the assumption that residual errors are independent across time and industries. Thus, contemporaneous correlation is allowed to be present within industries but not across industries. Bernard (1987) presents empirical evidence suggesting that independence of residuals across industries is a

reasonable assumption. However, the results of Christie (1987) and Beaver *et al.* (1989) suggest that residuals in a levels study are not independent across time. As a result, observations are not pooled across time in this study. For T=1 time periods, the Froot estimator of the covariance matrix reduces to

$$V(\hat{B}_N) = \frac{1}{N}\left(\frac{x_N'x_N}{N}\right)^{-1} \hat{\Theta}_N \left(\frac{x_N'x_N}{N}\right)^{-1}, \tag{6}$$

where

$$\hat{\Theta} = \frac{1}{N}\sum_{i=1}^{N} x_n'\hat{e}_n\hat{e}_n'x_n \tag{7}$$

is the estimated average K×Kcovariance matrix, n = 1,...,N indexes a particular industry with p_n firms per industry, $\hat{e}_n$ is a $p_n \times 1$ vector of OLS residuals, x_n is a $p_n \times K$ vector of regressors, and x_N is a stacked matrix comprised of the N x_n vectors.

Froot shows that the above covariance matrix is asymptotically unbiased and presents simulation results suggesting that asymptotic efficiency can be obtained in samples similar in size and composition to the samples used in this study. Although both OLS and Froot t-statistics were estimated, to aid presentation only Froot t-statistics are shown in subsequent tables.[13] The Froot t-statistics are generally lower than their OLS counterparts, but our interpretation of the results is the same under either method.

Another econometric issue concerns important explanatory variables that may be omitted from the models. In an attempt to control for industry specific variables that may be omitted, a covariance analysis is performed. In this analysis, a dummy variable is introduced for each industry, except for one. This formulation of the model allows intercepts to vary from industry to industry but assumes a common set of slope coefficients.

Adding the dummy variables to equation 5 and substituting BVT and BVBL for MVT and MVBL, respectively yields

$$\frac{MVE_i}{BVT_i} = \gamma_0 + \gamma_1 RD_i + \gamma_2 ADV_i + \gamma_3 GROW_i + \gamma_4 RISK_i + \gamma_5 \frac{BVBL_i}{BVT_i} + \gamma_6 \frac{NPA_i}{BVT_i} + \gamma_7 \frac{RHL_i}{BVT_i} + \sum_{n=1}^{24} \delta_n D_{ni} + \epsilon_i, \text{ where} \quad (8)$$

D_{ni} is an industry dummy variable coded one if the firm is in industry n and zero otherwise, δ_n is the coefficient for D_n, and other variables are defined as before. The estimation of equation 8 for the retiree health plan and combined samples is discussed below.

Estimation of Equation 8

Table V shows the results of estimating equation 8 for firms with retiree health plans. The left-hand side of the table uses the pay-as-you-go cost measure as a measure of retire health care liabilities; the right-hand side uses the liability measure introduced in Section II. Adjusted R^2s range from .53 to .56. The main variables of interest, retiree health costs and retiree health liability have coefficients that are significantly negative for all three years. The coefficients on reported health cost represent the market's estimate of the ratio of retiree health benefit liability to reported cost; at around -20, the market estimate is a bit below the estimates reported in Warshawsky (1991) and Coopers and Lybrand (1989). Similarly, coefficients on the estimated retiree health liability, around -.50, are about half of their theoretical value of -1. Although the point estimates of these coefficients suggest that the market considers a large, but still partial, portion of the retiree health liabilities when valuing stock, the true coefficients could be much different. For instance, in 1988, a 95 percent confidence interval for reported health cost indicates that the true coefficient may be as high as -5.7 or as low as -28.1. The true retiree health liability coefficient may be as high as -.21 or as low as -.72.

Insert Table V Approximately Here

The results for the other variables in the model are, in general, consistent with theory. The coefficients for advertising, growth, and research and development are consistently significantly positive, and for the book value of liabilities is consistently significantly negative, as hypothesized. The risk variable,

however, is significant only in 1988. The net pension asset variable is significantly positive in two of the three sample years; its coefficient is around the theoretically appropriate value of 1. This result is largely consistent with prior findings (see, for example, FS, FM, and Landsman, 1986) despite differences in funding levels during the time periods studied. In addition, tests indicate that the industry dummy coefficients are significantly different from zero. Thus, the covariate analysis increases explanatory power of the model and provides some control for omitted variables.

Table VI presents the regression results for the combined sample. The findings are broadly similar to those reported in Table V. The retiree health coefficients are still significant, but are somewhat smaller (in absolute value) than those in Table V, and have somewhat smaller standard errors. In 1988, 95 percent confidence intervals indicate a reported cost ratio as low as -20.8 and as high as -7.8 and a retiree health liability coefficient as low as -.67 and as high as -.25. Although adjusted-R^2s (ranging from .41 to .48) are lower than those reported in Table V, the coefficient on book value of liabilities is closer to its theoretically appropriate value.

Insert Table VI Approximately Here

It is difficult to compare the results of our study to that of Grant (1990) owing to the many significant differences in design. First, Grant utilizes smaller samples (ranging from 57 to 132 firms depending on the regression) of large companies for the years 1984 through 1986. Second, only firms that offer retiree health benefit plans are included in her samples. Third, Grant defines several variables differently. In particular, Grant does not estimate the accrued liability for retiree benefits, choosing instead to focus on reported pay-as-you-go cost as the variable of interest. Finally, Grant's t-statistics are based on OLS standard errors, and regressions exclude industry dummies.

Despite these differences, the findings of the two studies are generally consistent. Significance levels and coefficients for most variables exhibit a greater degree of variability across Grant's regression equations. Estimates of the coefficient for pay-as-you-go retiree health cost range from -7.4 to -42.1 for the various samples and years, with an average estimate of -21.4 over 28 regression equations. Our coefficient for the pay-

as-you-go cost version of RHL range from -13.9 to -22.8 with an average estimate of -18.1 over six regressions.

Comparison of Coefficients to Theoretical Values

In a further attempt to assess market perceptions of retiree health liabilities, the retiree health liability and book liability coefficients are compared to their theoretical values identified in Section III. The test statistic for comparing γ_5 or γ_7 to their theoretical value of -1 is $t = (\gamma_i - (-1)) / s_{\gamma i}$, where $s_{\gamma i}$ is the Froot standard error for γ_i. The test statistic for testing the null hypothesis of no difference between γ_5 and γ_7 is $t = (\gamma_5 - \gamma_7) / [s_{\gamma 5} + s_{\gamma 7} - 2\ cov(\gamma_5, \gamma_7)]^{1/2}$, using the Froot covariance matrix. Both t-statistics have n-k degrees of freedom, where n is the number of firms and k is the number of independent variables.

The results of the tests for both the retiree health plan and combined samples are summarized in Table VII. Using an alpha level of .05, γ_7 is significantly different (lower in absolute magnitude) than -1 in 1987 and 1988 for both samples. We fail to reject the null hypothesis, $\gamma_5 = \gamma_7$, for the health plan sample, but decisively reject the hypothesis for the combined sample. This result arises, in part, from γ_5 becoming much closer to its theoretical value, with a tighter distribution, when the combined sample is used. To the extent that the combined sample models are viewed as being better specified because coefficients other than γ_7 are more consistent with theoretical values and a larger sample is being employed, there is some indication that the market is underpricing the health liability.

Insert Table VII Approximately Here

VI. Conclusions

This study employs the framework of the new accounting standard for retiree health benefits, Statement No. 106, with the information already disclosed in footnotes to annual reports under the current accounting standard, Statement No. 81, to judge the extent to which the market recognizes corporate obligations for retiree health plans in valuing corporate equity securities. The results reported in Tables V through VII suggest that the market is aware of health liabilities but may be valuing them imprecisely, perhaps with a downward bias. The standard errors for the retiree health plan coefficients are high, thereby making point estimates of market perceptions difficult. The 1988 columns of Table VI contain the most precise

estimates for the coefficients on retiree health benefit variables in the market valuation model. For a 95 percent confidence interval, the reported cost coefficient, representing the market's estimate of the liability-to-cost ratio, is expected to lie between -7.8 and -20.8, instead of the theoretical value centered at -30. The coefficient on retiree health liability is expected to lie between -.25 and -.67, instead of the theoretical value of -1. In addition, there is some evidence that the retiree health liability is priced with less regard than book liabilities.

What are possible reasons for these results? First, the large standard errors for the two retiree health liability measures is understandable given the current level of disclosure and uncertainty related to the assumptions required for future health cost trends and for government actions concerning the regulation of retiree health plans and Medicare. To the extent that the imprecision is due to lack of disclosure, there may be significant price adjustments, upward and downward, upon the release of Statement No. 106 information. However, if the imprecision is due to a large degree of uncertainty regarding future corporate and government actions, then share prices may move very little upon the release of information under the new accounting standard. Second, the finding that retiree health liabilities may have less of an effect on market values than other firm liabilities suggests that the market may be making assumptions that are more liberal than required by the FASB pronouncement or that the market is anticipating corporate or government actions that will reduce companies' liabilities for retiree health benefits.